

WHAT IS CLAIMED IS:

1. An ink jet printer, comprising:
 - a print head that has at least one ink nozzle and performs printing to a recording medium by ejecting ink from the ink nozzle;
 - an ink tank that stores ink to be supplied to the print head;
 - an ink passage that is connected to the ink tank to supply ink from the ink tank;
 - an air chamber that is connected to the ink passage and the print head to store air generated in the ink passage;
 - a purge device that discharges the air stored in the air chamber from the ink nozzle; and
 - a filter member that divides a lower portion of the air chamber into a first chamber at an ink tank side and a second chamber at a print head side, the filter member passes ink through when the print head performs printing, wherein an upper portion of the air chamber has less resistance to the ink flow than that of the filter member, the air is stored in the top portion of the air chamber when the ink head performs printing and the air stored in the air chamber is discharged when the purge device generates an ink flow that goes over the filter member.
2. The ink jet printer according to claim 1, wherein the upper portion of the air chamber is an opening that communicates the first chamber and the second chamber.
3. The ink jet printer according to claim 1, further comprising a second filter that is connected to the filter and the air chamber and has less resistance to the ink flow than that of the filter, wherein the second filter divides the air chamber into the first and second chambers together with the filter.
4. The ink jet printer according to claim 3, wherein the second filter extends from the top portion of the filter.
5. The ink jet printer according to claim 1, wherein a volume of the second chamber is smaller than that of the first chamber.
6. The ink jet printer according to claim 1, wherein the first and second chambers are formed by more than two parts and the filter is held between the parts.
7. The ink jet printer according to claim 1, wherein an inside of the second chamber is formed of a material having a better wettability than that of the first chamber.
8. The ink jet printer according to claim 1, wherein the ink tank is communicated with a bottom portion of the first chamber and the print head is communicated with a bottom portion of the second chamber.

9. The ink jet printer according to claim 1, further comprising a detecting device that detects whether a predetermined level of air is stored in the air chamber and a purge control device that operates the purge device when the detecting device detects the predetermined level of air is stored in the air chamber.

10. The ink jet printer according to claim 1, wherein an inside wall of the top portion of the first chamber is in a curved shape, a volume of which decreases toward the top portion and the top portion is connected to the second chamber.

11. The ink jet printer according to claim 1, wherein the air chamber is provided with a permanent air chamber that stores a certain amount of air after the purge device conducts the purge operation.

12. The ink jet printer according to claim 11, wherein the permanent air chamber is located above the ink flow generated by the purge device.

13. The ink jet printer according to claim 12, wherein the permanent air chamber is located at the top portion of the first chamber and is recessed from a top surface of the second chamber.

14. The ink jet printer according to claim 13, wherein the permanent air chamber is located above an ink inlet of the air chamber.

15. The ink jet printer according to claim 12, wherein the permanent air chamber is formed over an entire area of the top portion of the first chamber.

16. The ink jet printer according to claim 1, further comprising a guide wall that divides the first chamber but keeps the top portion of the first chamber open, wherein the guide wall guides pressure waves propagating from the ink passage to the top portion of the air chamber.

17. The ink jet printer according to claim 16, wherein the air chamber includes a third chamber formed by the guide wall, the third chamber is connected to the ink passage and a top portion of the third chamber communicates with the first chamber.

18. The ink jet printer according to claim 17, wherein the third chamber is located above the ink inlet of the air chamber.

19. The ink jet printer according to claim 18, wherein the guide wall has a height greater than a height of the filter.

20. The ink jet printer according to claim 19, wherein the guide wall extends from the bottom of the air chamber to a point at a certain distance from the ceiling of the air chamber, the filter is located substantially parallel to the guide wall at the other side of the

first chamber, the ink inlet is located at the bottom of the third chamber and a bottom of the second chamber is connected to the print head.

21. The ink jet printer according to claim 16, further comprising a first detecting device that detects whether a predetermined level of air is stored in the air chamber, a second detecting device that detects whether ink is stored at a predetermined ink level and a purge control device that operates the purge device when the first detecting device detects the predetermined level of air is stored in the air chamber and stops the purging operation when the second detecting device detects that ink is stored at the predetermined ink level in the air chamber.

22. The ink jet printer according to claim 1, further comprising a plurality of the print heads, a plurality of the ink tanks, a plurality of the ink passages, a plurality of the air chambers, and a connecting member that is provided with a plurality of connecting ports, wherein each connecting port of the connecting member communicates with a corresponding ink passage.

23. The ink jet printer according to claim 22, wherein the connecting member is made of an elastic material.

24. The ink jet printer according to claim 23, wherein the air chambers are formed into one body.

25. The ink jet printer according to claim 1, further comprising a feed mechanism that opposes the print head and feeds a recording medium, wherein the filter member is placed substantially parallel to the recording medium fed by the feed mechanism.

26. The ink jet printer according to claim 1, further comprising a carriage on which the print head and the air chamber are mounted that moves along the recording medium, wherein the filter member is placed substantially parallel to the moving direction of the carriage.

27. The ink jet printer according to claim 26, wherein the first and second chambers are substantially perpendicular to the moving direction of the carriage.

28. The ink jet printer according to claim 27, wherein the air chamber is directly connected with the print head.

29. The ink jet printer according to claim 22, wherein the filter member is provided to cover a plurality of air chambers.

30. The ink jet printer according to claim 1, further comprising:
a first flexible wiring member that is connected with a driving element of the print head;

a body on which the print head is mounted;
 a carriage on which the body is mounted that moves along the recording medium;

a control circuit that controls the driving element of the print head;
 a second flexible wiring member that is connected with the first flexible wiring member and the control circuit; and

an interface board that is connected with the first flexible wiring member and is placed substantially parallel to the body at a side of the air chamber opposite the print head, wherein the interface board connects the first and second flexible wiring members.

31. An ink jet printer, comprising:

a print head that has at least one ink nozzle and performs printing on a recording medium by ejecting ink from the ink nozzle;

an ink tank that stores ink to be supplied to the print head;

an ink passage that is connected to the ink tank to supply ink from the ink tank;

an air chamber that is connected to the ink passage and the print head to store air generated in the ink passage;

a purge device that discharges the air stored in the air chamber from the ink nozzle;

a wall that divides a lower portion of the air chamber into a first chamber at an ink tank side and a second chamber at a print ink head side in such a manner that the first and second chambers communicate at a upper portion of the air chamber;

an ink hole that is disposed on the wall; and

a valve member that opens the ink hole to pass the ink supplied from the ink passage there through when the print head performs printing and closes the ink hole to cut the ink flow when the purge device conducts the purging operation, wherein the air stored in the air chamber is discharged when the purge device generates an ink flow that goes over the wall.

32. The ink jet printer according to claim 31, wherein the valve member does not close as a result of the ink flow generated when the print head performs printing.

33. The ink jet printer according to claim 32, wherein the valve member is disposed on the wall at the side of the first chamber and has a surface area larger than the ink hole that is configured to open the ink hole when the print head performs printing and close the ink hole when the purge device conducts the purging operation.

34. The ink jet printer according to claim 33, wherein the valve member that covers the ink hole at the side of the first chamber, is provided with a flexible portion of which outer portion moves along the wall and of which center portion moves toward the wall and at least one communication hole that is formed at a position of the flexible portion offset from the ink hole when the center portion of the flexible portion moves close to the wall, wherein the outer portion of the flexible portion bends so as to move the center portion of the flexible portion away from the wall, when the print head performs printing, to open the ink hole and to communicate the ink hole with the first chamber through the ink hole and communication hole, and wherein the outer portion of the flexible portion bends so as to move the center portion of the flexible portion closer to the wall, when the purge device conducts the purging operation, to close the ink hole and the at least one communication hole to cut off the communication between the ink hole and the first chamber.

35. The ink jet printer according to claim 32, wherein the valve member has:
a float member having a relative density less than that of ink and
an outer figure larger than that of the ink hole, and has a support member that supports the float member in the first chamber so that the float member contacts the ink hole.

36. The ink jet printer according to claim 31, wherein a volume of the second chamber is smaller than that of the first chamber.

37. The ink jet printer according to claim 31, wherein the first and second chambers are formed by more than two parts and the wall is held between the parts.

38. The ink jet printer according to claim 31, wherein an inside of the second chamber is formed of a material having a better wettability than that of the first chamber.

39. The ink jet printer according to claim 31, wherein the ink tank is communicated with a bottom portion of the first chamber and the print head is communicated with a bottom portion of the second chamber.

40. The ink jet printer according to claim 31, further comprising a detecting device that detects whether a predetermined level of air is stored in the air chamber and a purge control device that operates the purge device when the detecting device detects the predetermined level of air is stored in the air chamber.

41. The ink jet printer according to claim 31, wherein an inside wall of the top portion of the first chamber is in a curved shape of which volume decreases toward the top portion and the top portion is connected to the second chamber.

42. The ink jet printer according to claim 31, wherein the air chamber is provided with a permanent air chamber that stores a certain amount of air after the purge device operates the purging operation.

43. The ink jet printer according to claim 42, wherein the permanent air chamber is located above the ink flow generated by the purge device.

44. The ink jet printer according to claim 43, wherein the permanent air chamber is located at the top portion of the first chamber and is recessed with respect to a top portion of the second chamber.

45. The ink jet printer according to claim 43, wherein the permanent air chamber is located above an ink inlet of the air chamber.

46. The ink jet printer according to claim 43, wherein the permanent chamber is formed by all of the top portion of the first chamber.

47. The ink jet printer according to claim 31, further comprising a guide wall that divides the first chamber but keeps the top portion of the first chamber open, wherein the guide wall guides pressure waves propagating from the ink passage to the top portion of the air chamber.

48. The ink jet printer according to claim 32, wherein the air chamber includes a third chamber formed by the guide wall, the third chamber is connected to the ink passage and a top portion of the third chamber communicates with the first chamber.

49. The ink jet printer according to claim 48, wherein the third chamber is located above the ink inlet of the air chamber.

50. The ink jet printer according to claim 48, wherein the guide wall is taller than the filter.

51. The ink jet printer according to claim 49, wherein the guide wall extends from the bottom of the air chamber to a point at a certain distance from the ceiling of the air chamber, the filter is located substantially parallel to the guide wall at the other side of the first chamber, the ink inlet is located at the bottom of the third chamber and a bottom of the second chamber is connected to the print head.

52. The ink jet printer according to claim 47, further comprising a first detecting device that detects whether a predetermined level of air is stored in the air chamber, a second detecting device that detects whether ink is stored at a predetermined ink level and a purge control device that operates the purge device when the first detecting device detects the predetermined level of air is stored in the air chamber and stops the purging operation when

the second detecting device detects that ink is stored at the predetermined ink level in the air chamber.

53. The ink jet printer according to claim 31, further comprising a plurality of the print heads, a plurality of the ink tanks, a plurality of the ink passages, a plurality of the air chambers, and a connecting member that is provided with a plurality of connecting ports, wherein each connecting port of the connecting member is communicated with a corresponding ink passage.

54. The ink jet printer according to claim 53, wherein the connecting member is made of an elastic material.

55. The ink jet printer according to claim 54, wherein the air chambers are formed into one body.

56. An ink jet printer, comprising:

- a print head that has at least one ink nozzle and performs printing to a recording medium by ejecting ink from the ink nozzle;
- an ink tank that stores ink to be supplied to the print head;
- an ink passage that is connected to the ink tank to supply ink from the ink tank;
- an air chamber that is connected to the ink passage and the print head to store air generated in the ink passage;
- a purge device that discharges the air stored in the air chamber from the ink nozzle; and
- a wall member that divides a lower portion of the air chamber into a first chamber at an ink tank side and a second chamber at a print head side, wherein the lower portion of the air chamber has greater resistance to the ink flow than that of an upper portion of the air chamber, an inside wall of the top portion of the first chamber is in a taper shape to have a decreasing volume toward the top portion, the top portion connected to the second chamber, and the air is stored in the top portion of the air chamber when the print head performs printing and the air stored in the air chamber is discharged when the purge device generates an ink flow that goes over the wall member.

57. The ink jet printer according to claim 56, wherein the upper portion of the air chamber is an opening that connects the first and second chambers and the wall member at the lower portion of the air chamber is provided with a filter.

58. The ink jet printer according to claim 56, wherein a volume of the second chamber is smaller than that of the first chamber.

59. The ink jet printer according to claim 57, wherein the first and second chambers are formed by more than two parts and the filter is held between the parts.

a print head that has at least one ink nozzle and performs printing on a recording medium by ejecting ink from the ink nozzle;

an ink tank that stores ink to be supplied to the print head;

an ink passage that is connected to the ink tank to supply ink from the ink tank;

an air chamber that is connected to the ink passage and the print head to store air generated in the ink passage;

a purge device that discharges the air stored in the air chamber from the ink nozzle; and

a permanent air chamber that stores a certain amount of air after the purge device operates the purging operation, wherein the permanent air chamber is located above the ink flow generated by the purge device, and the air is stored in the top portion of the air chamber when the ink head performs printing and the air stored in the air chamber is discharged so as to keep the certain amount of air stored in the permanent chamber when the purge device generates an ink flow that goes over the wall member.

66. The ink jet printer according to claim 65, further comprising a wall member that divides a lower portion of the air chamber into a first chamber at an ink tank side and a second chamber at the print head side, wherein the lower portion of the air chamber has greater resistance to the ink flow than that of an upper portion of the air chamber, the upper portion of the air chamber is an opening that connects the first and second chambers and the wall member at the lower portion of the air chamber is provided with a filter, and the permanent air chamber is located at the top portion of the first chamber higher than the second chamber divided by the wall member.

67. An ink jet printer, comprising:

a print head that has at least one ink nozzle and performs printing on a recording medium by ejecting ink from the ink nozzle;

an ink tank that stores ink to be supplied to the print head;

an ink passage that is connected to the ink tank to supply ink from the ink tank;

an air chamber that is connected to the ink passage and the print head to store air generated in the ink passage;

a purge device that discharges the air stored in the air chamber from the ink nozzle;

a wall member that divides a lower portion of the air chamber into a first chamber at an ink tank side and a second chamber at the print head side; and

a guide wall that divides the first chamber to create a third chamber but keeps the top portion of the first chamber open, wherein the lower portion of the air chamber has greater resistance to the ink flow than that of an upper portion of the air chamber, the air is stored in the top portion of the air chamber when the ink head performs printing and the air stored in the air chamber is discharged when the purge device generates an ink flow that goes over the wall member, and the guide wall guides pressure waves propagating from the ink passage to the top portion of the air chamber.

68. The ink jet printer according to claim 67, wherein the guide wall has a height greater than a height of the wall member.

69. The ink jet printer according to claim 68, wherein the guide wall extends from the bottom of the air chamber to a point at a certain distance from the ceiling of the air chamber, the wall member is located substantially parallel to the guide wall at the other side of the first chamber, the ink inlet is located at the bottom of the third chamber and a bottom of the second chamber is connected to the print head.

70. An ink jet printer, comprising:

a plurality of print heads, each print head having at least one ink nozzle to perform printing on a recording medium by ejecting ink from the ink nozzle;
a plurality of ink tanks that store ink to be supplied to the print heads;
a plurality of ink passages that are connected to respective ink tanks to supply ink from the ink tanks;

a plurality of air chambers that are connected to the respective ink passages and respective print heads to store air generated in the respective ink passages;

a purge device that discharges the air stored in the air chambers from the at least one ink nozzle of each print head;

a wall member that divides a lower portion of each air chamber into a first chamber at an ink tank side and a second chamber at the print head side; and

a connecting member that is provided with a plurality of a connecting ports, wherein the lower portion of the air chamber has greater resistance to the ink flow than an upper portion of the air chamber, the connecting ports of the connecting member are communicated with the respective ink passages, and the air is stored in the top portion of the air chamber when the ink head performs printing and the air stored in each air chamber is discharged when the purge device generates an ink flow that goes over the wall member.

71. The ink jet printer according to claim 70, wherein the upper portion of the air chamber is an opening that connects the first and second chambers and the wall member at the lower portion of the air chamber is provided with a filter.

72. The ink jet printer according to claim 71, wherein the plurality of air chambers are formed into one body.

73. An ink jet printer, comprising:
 a plurality of print heads, each print head having at least one ink nozzle to perform printing on a recording medium by ejecting ink from the at least one ink nozzle;
 a plurality of ink tanks that each stores an ink to be supplied to a respective print head of the plurality of print heads;
 a plurality of ink passages that are connected to respective ink tanks to supply ink from the respective ink tanks;
 a plurality of air chambers that are connected to respective ink passages and associated print heads to store air generated in the ink passages;
 a purge device that discharges the air stored in the air chambers from the at least one ink nozzle of each print head; and
 a connecting member that is provided with a plurality of a connecting ports, wherein the connecting ports of the connecting member are communicated with the respective ink passages, the air chambers are formed into one body, and the air is stored in the top portion of each air chamber when the ink heads perform printing and the air stored in the air chambers is discharged when the purge device generates an ink flow that goes over the wall member.

74. The ink jet printer according to claim 73, wherein the upper portion of the air chamber is an opening that connects the first and second chambers and the wall member at the lower portion of the air chamber is provided with a filter.

75. The ink jet printer according to claim 73, wherein the first and second chambers are formed by more than two parts and the wall member is held between the parts.

76. An ink jet printer, comprising:
 a plurality of print heads, each having at least one ink nozzle, to perform printing on a recording medium by ejecting ink from the ink nozzle;
 a plurality of ink tanks, each ink tank storing an ink to be supplied to a print head of the plurality of print heads;
 a plurality of ink passages that are connected to respective ink tanks to supply ink from the ink tanks;

a connecting member that is provided with a plurality of a connecting ports, wherein the connecting ports of the connecting member are communicated with the respective ink passages, and the air is stored in the top portion of each air chamber when the plurality of print heads perform printing and the air stored in the air chambers is discharged when the purge device generates an ink flow that goes faster than an ink flow generated when the print heads perform printing.

78. An ink jet printer, comprising:

a plurality of ink tanks that store ink to be supplied to respective print heads;

a plurality of air chambers that are connected to respective ink passages and respective print heads to store air generated in the respective ink passages;

a connecting member that is provided with a plurality of a connecting ports, wherein the plurality of the air chambers are formed into one body, and the air is stored in the top portion of each air chamber when the plurality of print heads perform printing and the air stored in the air chambers is discharged when the purge device generates an ink flow that goes faster than an ink flow generated when the print heads perform printing.

80. An ink jet printer, comprising:

a print head that has at least one ink nozzle and performs printing on a recording medium by ejecting ink from the ink nozzle;

an ink tank that stores ink to be supplied to the print head;

an ink passage that is connected to the ink tank to supply ink from the ink tank;

an air chamber that is connected to the ink passage and the print head to store air generated in the ink passage;

a purge device that discharges the air stored in the air chamber from the ink nozzle;

a first flexible wiring member that is connected with a driving element of the print head;

a body on which the print head is mounted;

a carriage on which the body is mounted that moves along the recording medium;

a control circuit that controls the driving element of the print head;

a second flexible wiring member that is connected with the first flexible wiring member and the control circuit; and

an interface board that is connected with the first flexible wiring member and is placed substantially parallel to the body at a side of the air chamber opposite to the print head, wherein the interface board connects the first and second flexible wiring members, and the air is stored in the top portion of the air chamber when the ink head performs printing and the air stored in the air chamber is discharged when the purge device generates an ink flow that goes faster than an ink flow generated when the ink head performs printing.